



Mizoguchi Lab.

[Paving the way for Materials Design]

Institute of Industrial Science, Dept. Mater. Envi. Science

Nano-Materials Design Lab.

<http://www.edge.iis.u-tokyo.ac.jp>

Microscopy, Spectroscopy, and Calculation

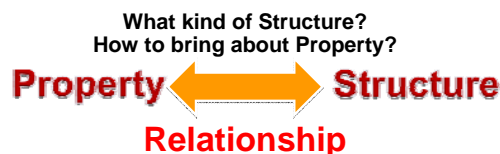
Structure-Property Relationship



Research of Mizoguchi Lab.

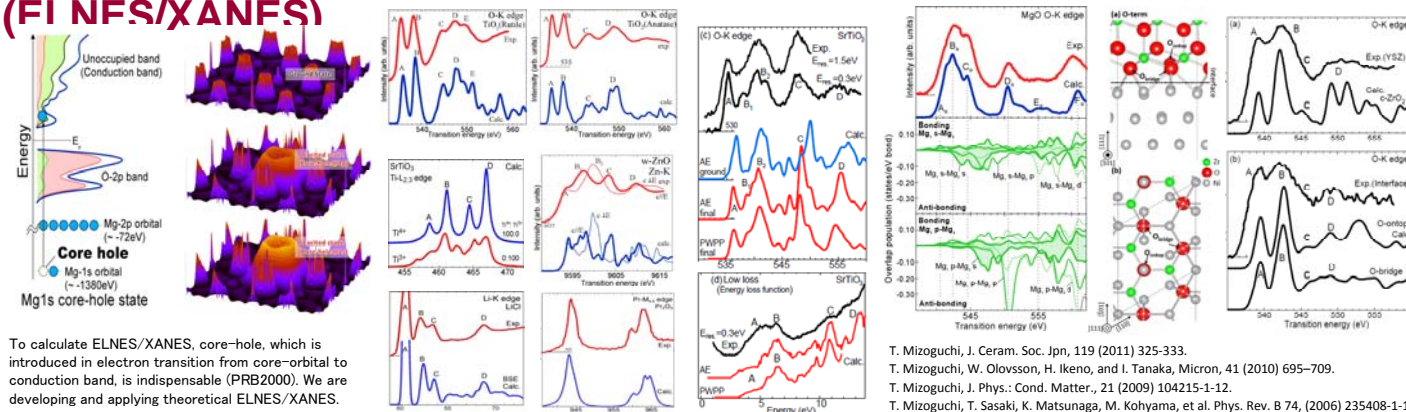
Much higher performance and higher reliability are now required to the materials to achieve further technology developments. In case of electroceramics, such as multi-layer ceramic capacitor and varistor, the size their grains in electric devices becomes smaller and smaller, ca. 1 μ m or less, and thus further property improvements of each grain and grain boundary are desired. To achieve this, clarification of atomic and electronic structures and finding the way to improve their properties are indispensable.

In our group, atomic and electronic structure analysis of materials are investigating by combining electron energy loss spectroscopy (EELS), transmission electron microscopy (TEM), and first principles calculation. By combining those methods, atomic and electronic structures and their relationships to materials properties can be unraveled. Particularly, superlattice, ionic liquid, Li-ion battery, silicon and electroceramics are investigated.



Calculation and Application of Core-loss spectroscopy

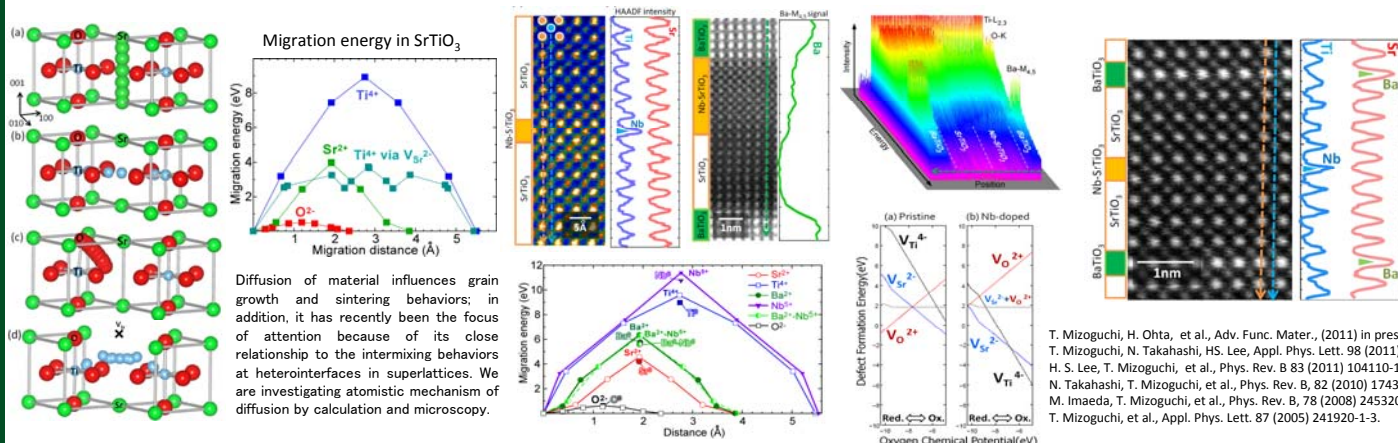
(FI NFS/XANES)



To calculate ELNES/XANES, core-hole, which is introduced in electron transition from core-orbital to conduction band, is indispensable (PRB2000). We are developing and applying theoretical ELNES/XANES.

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Atomistic Study on Diffusion



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